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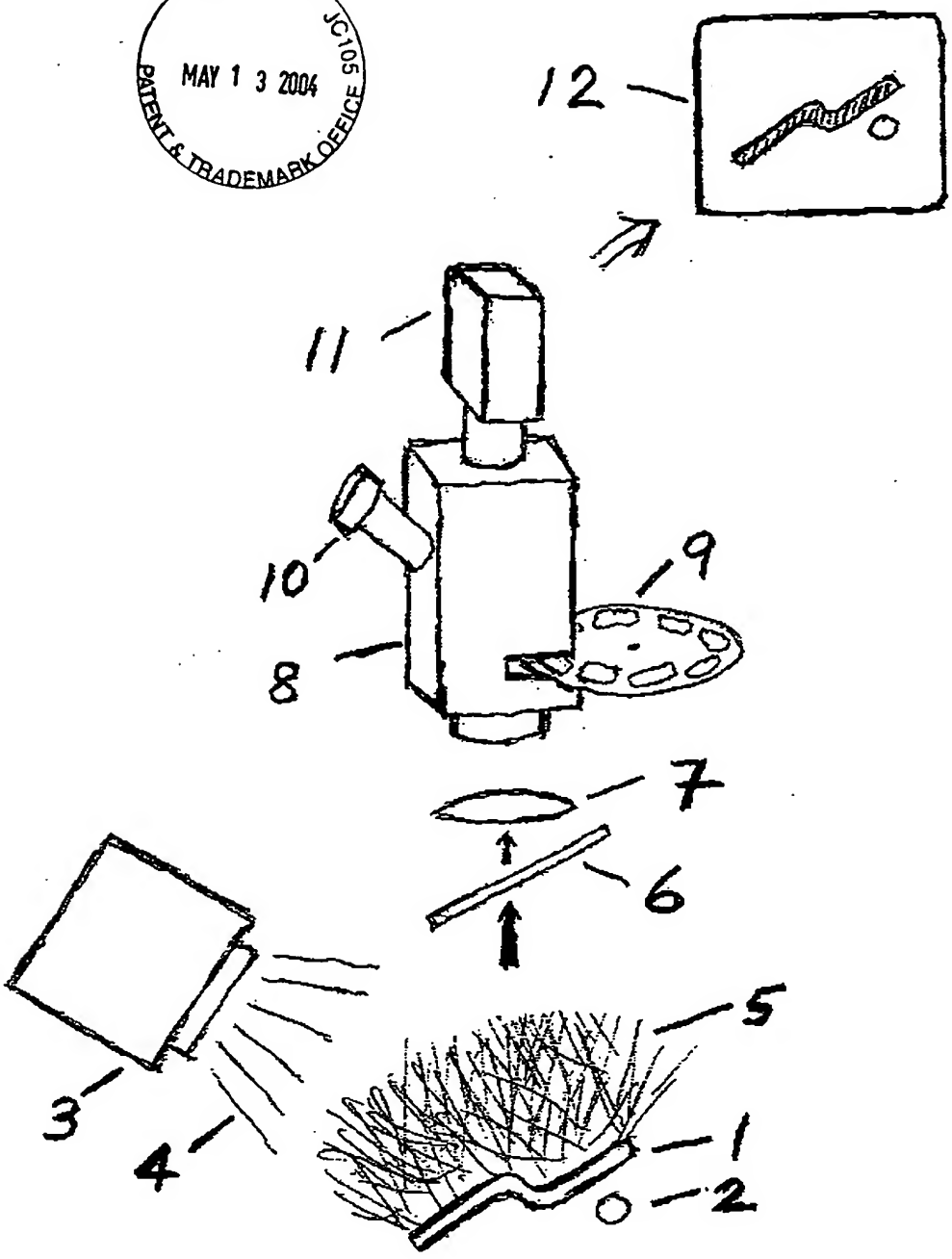


Figure 1
(Prior Art)

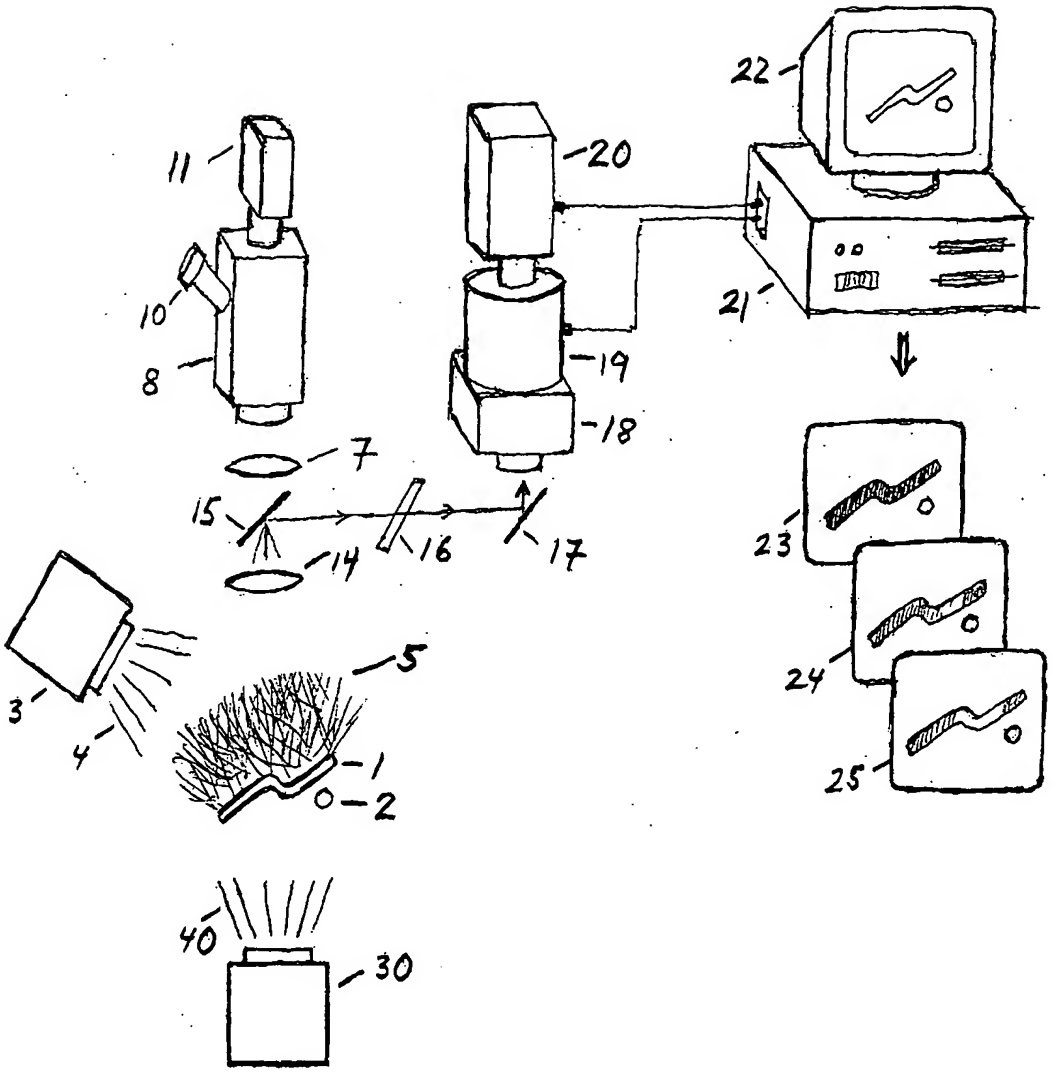


Figure 2

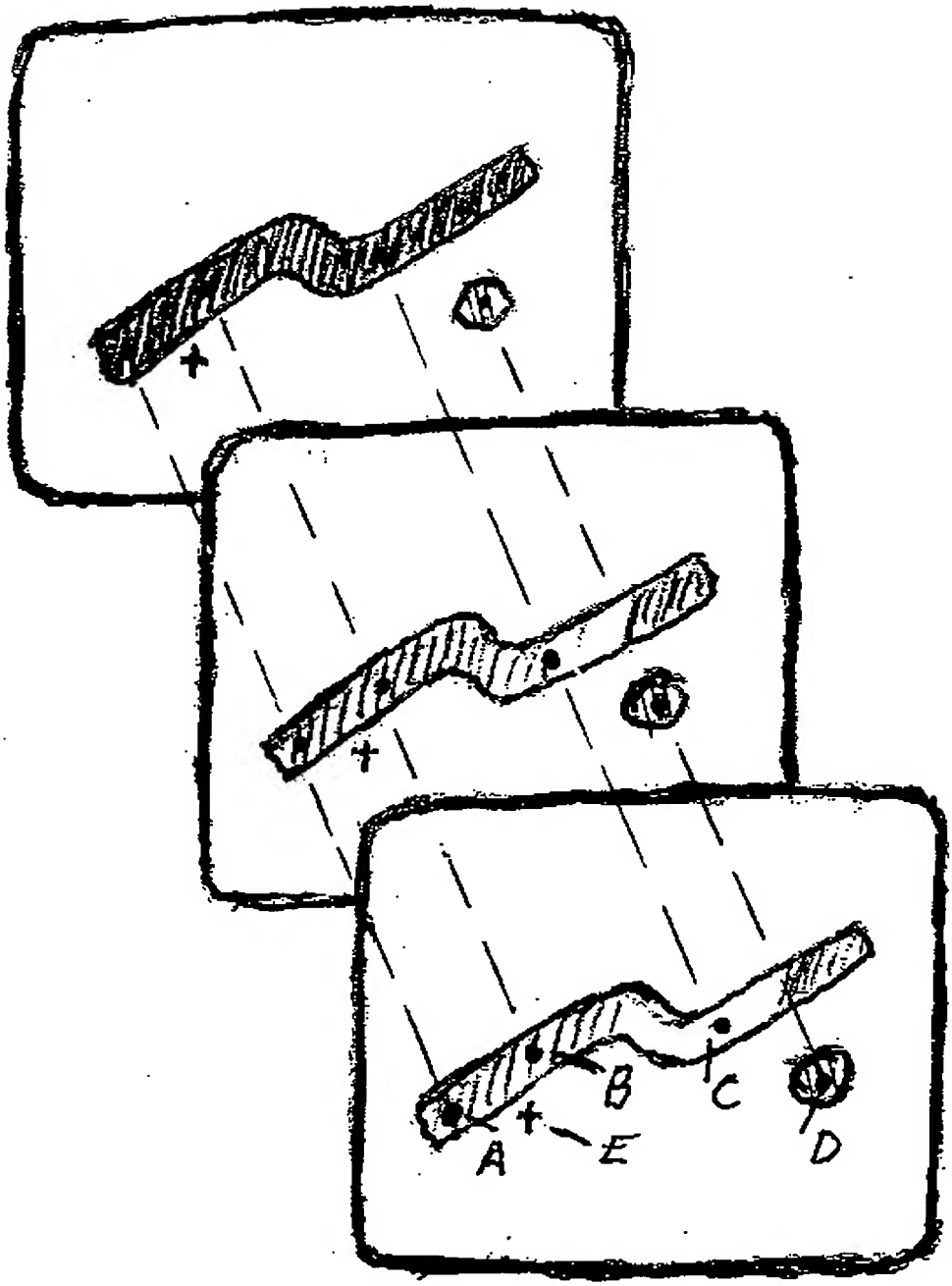


Figure 3

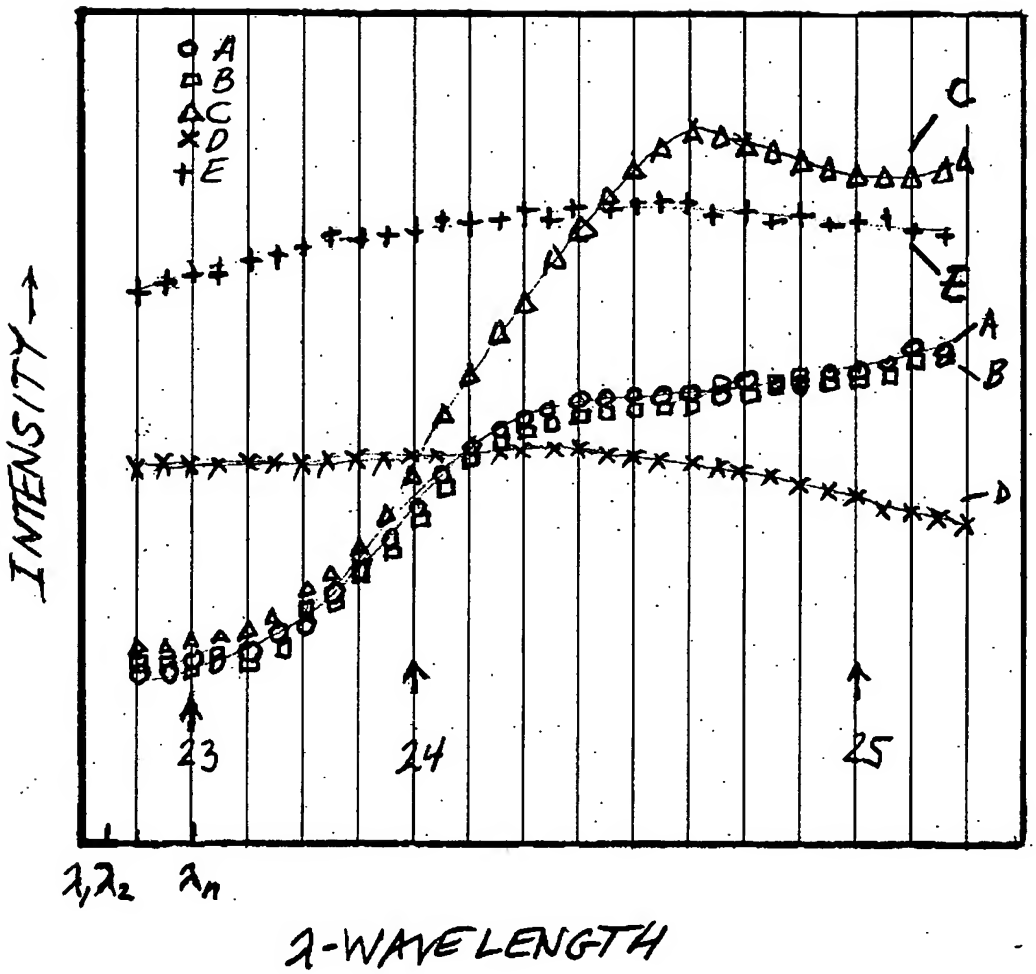
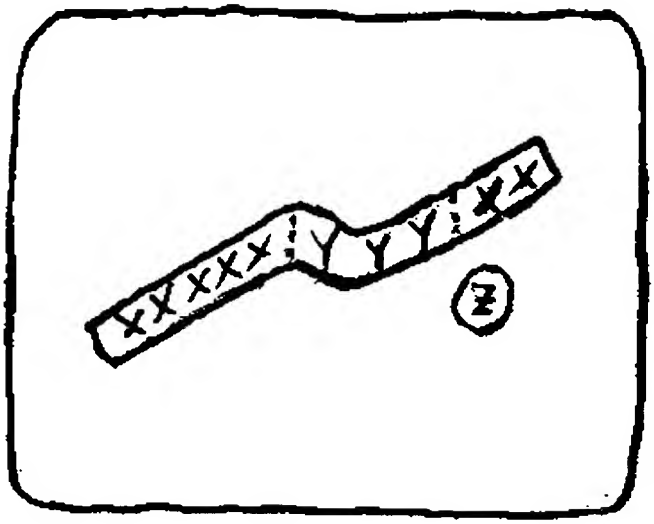


Figure 4

5A:



5B:

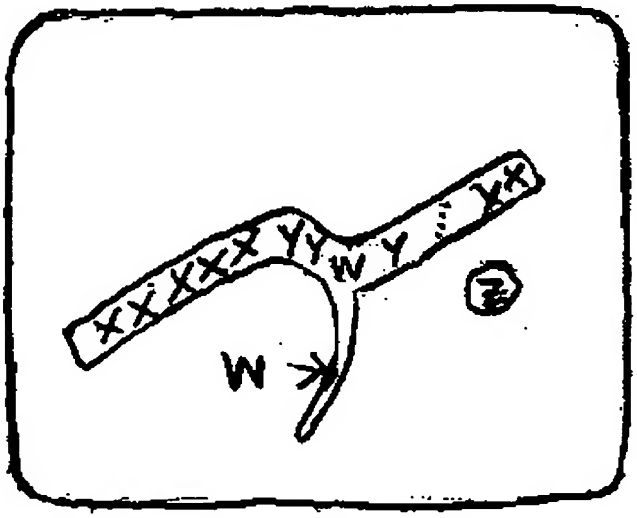
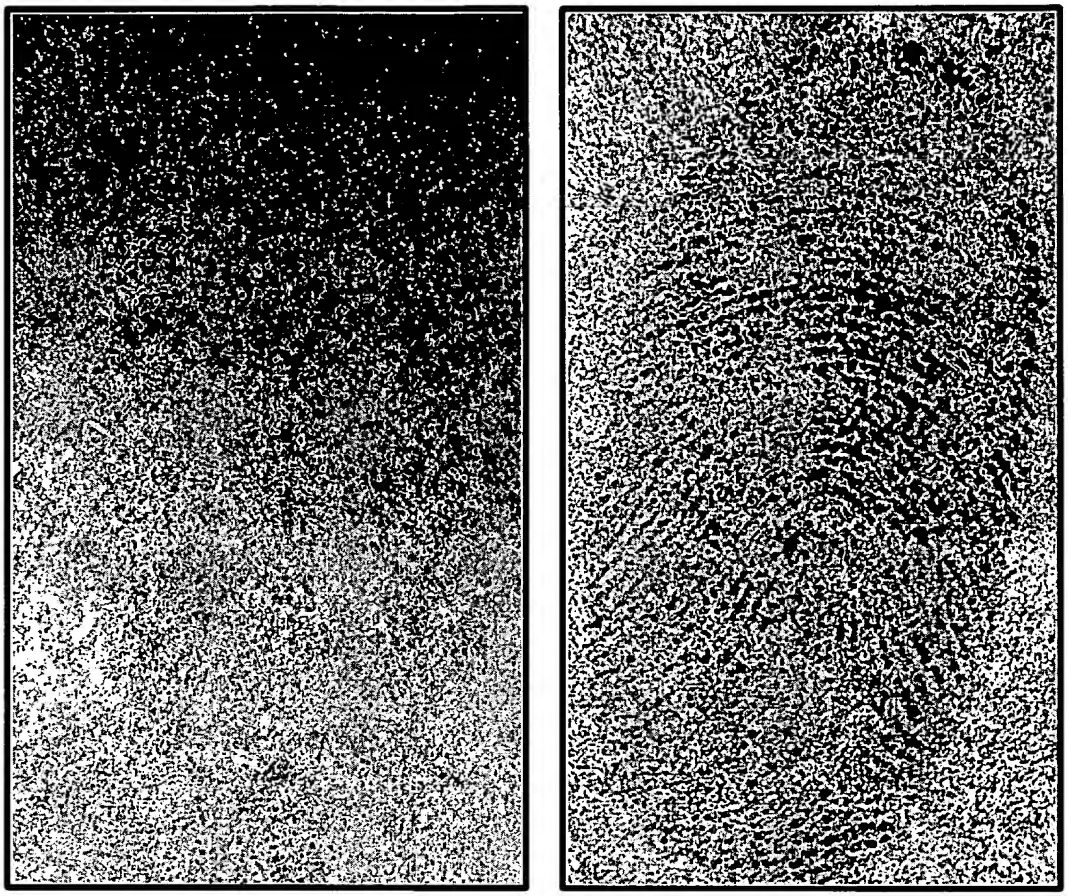
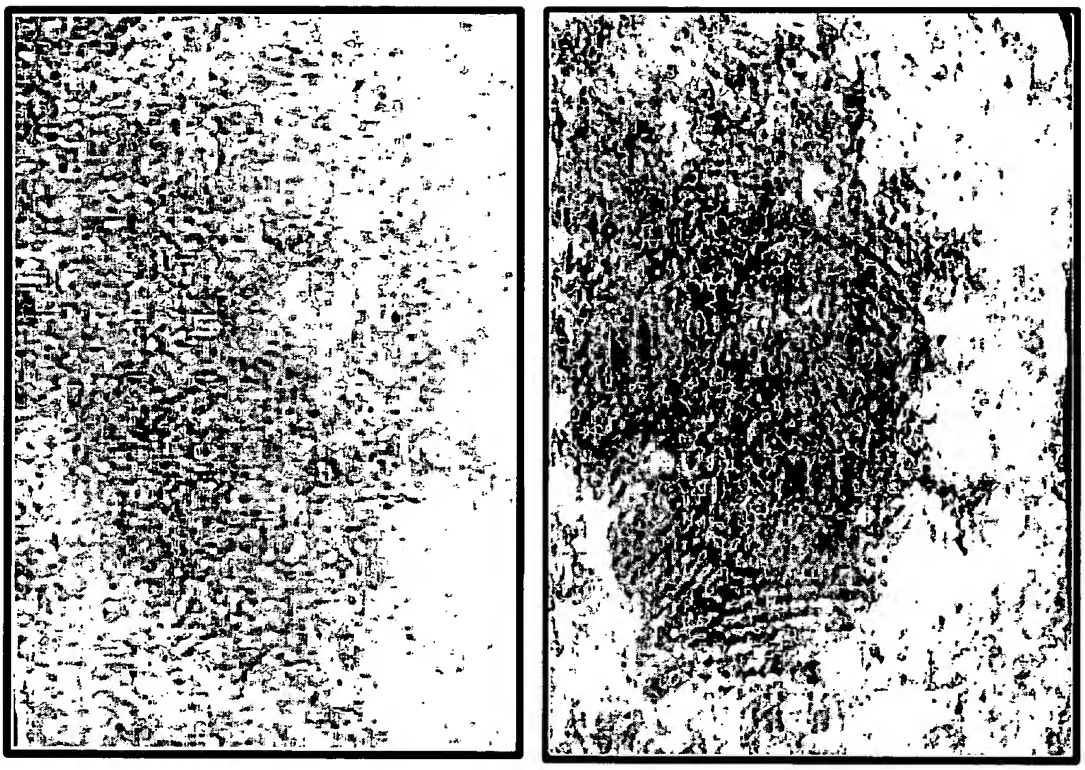


Figure 5



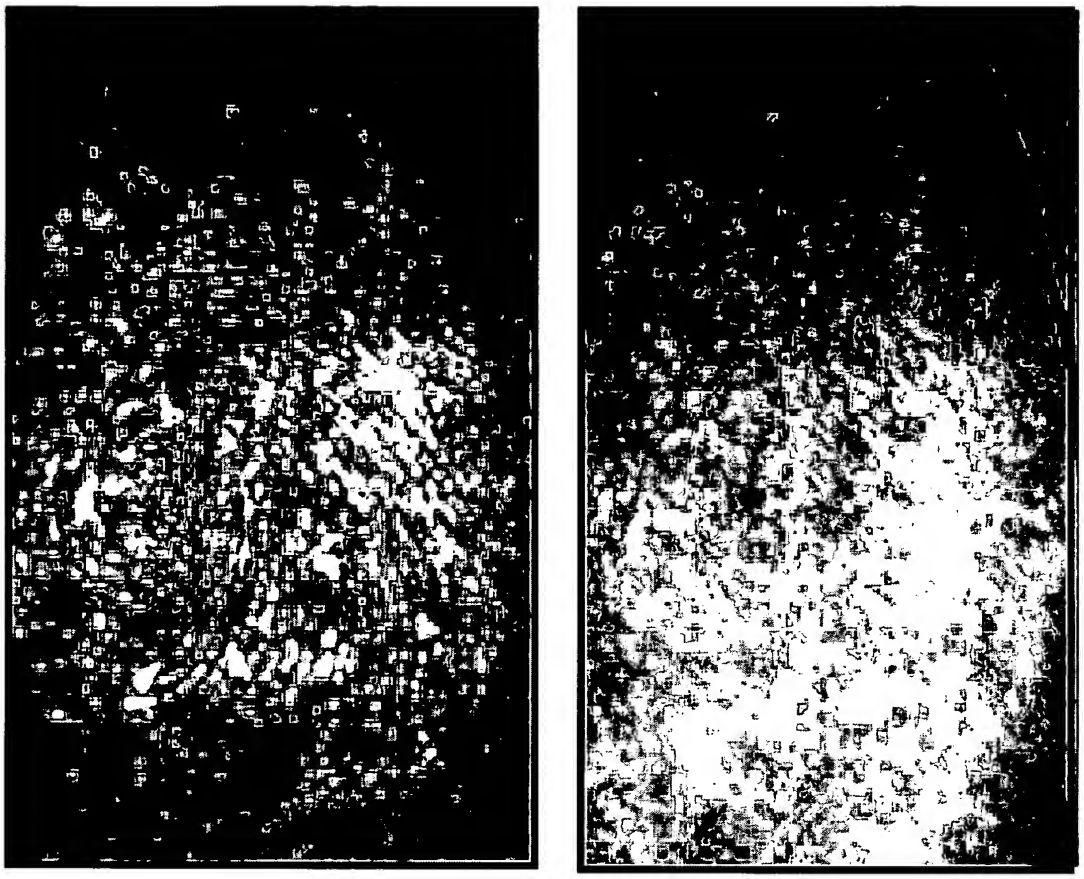
A B

Figure 6



A B

Figure 7



A B

Figure 8

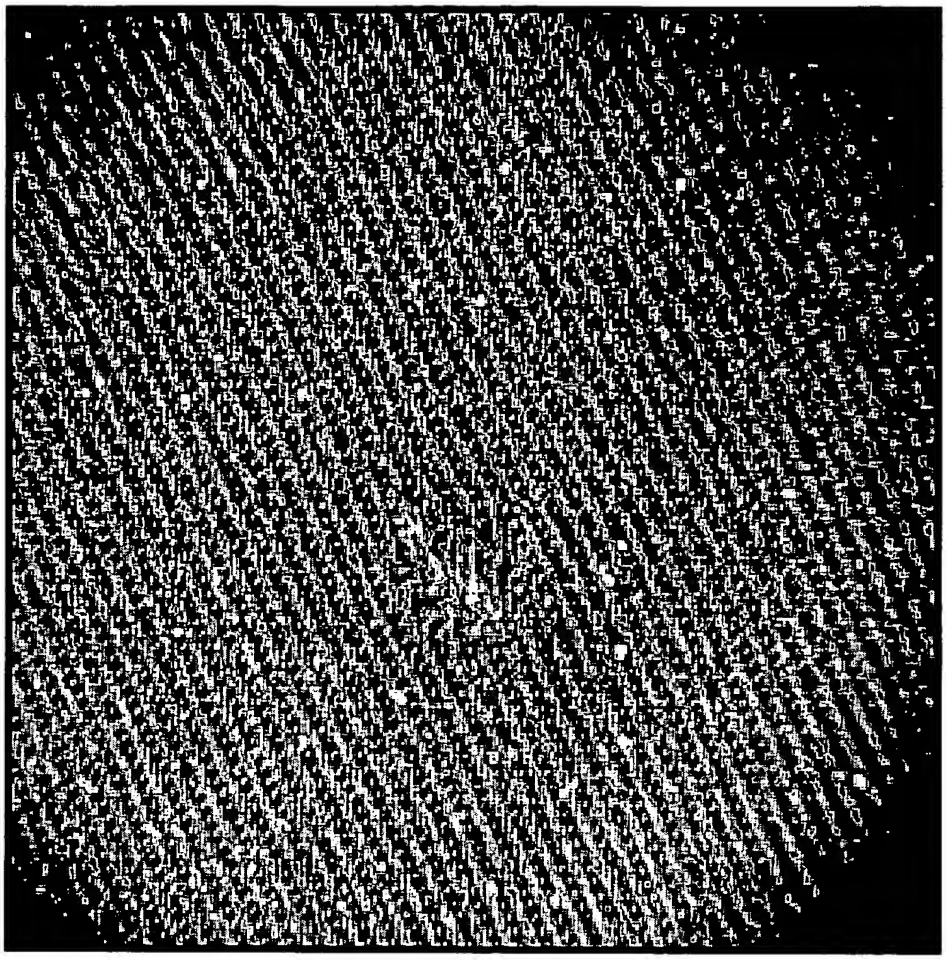


Figure 9

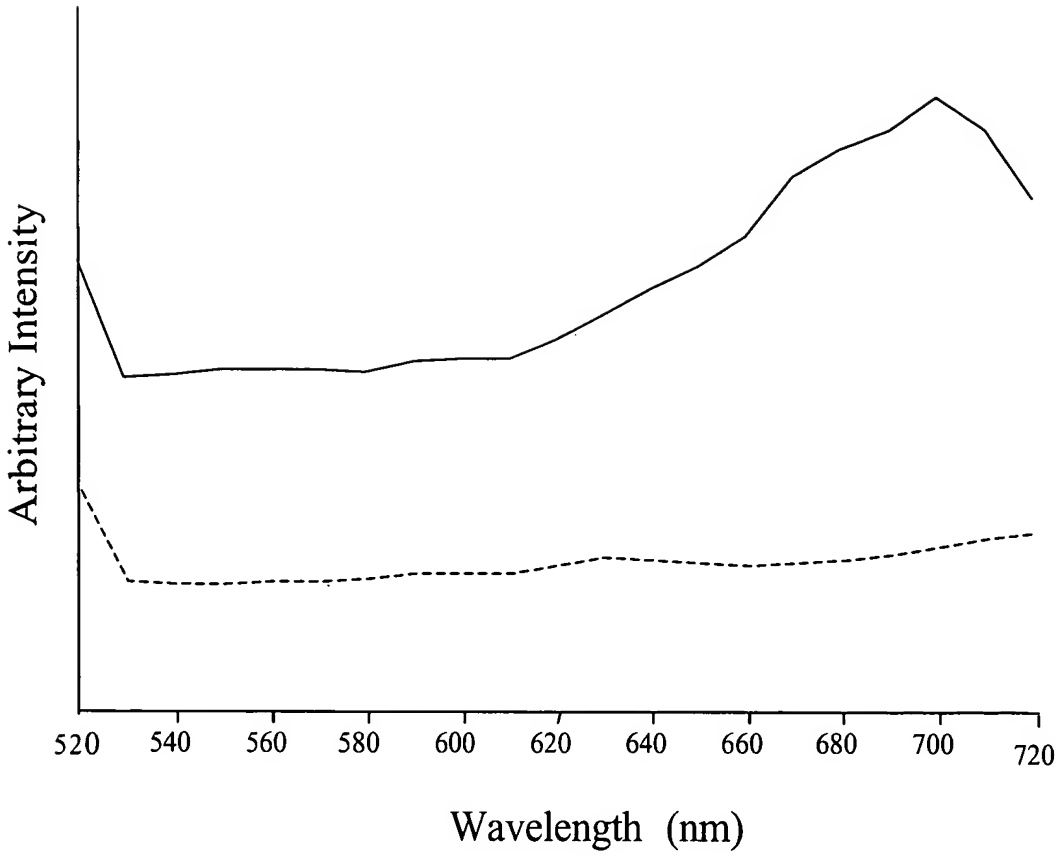

Arbitrary Intensity
520
540
560
580
600
620
640
660
680
700
720
Wavelength (nm)

Figure 10

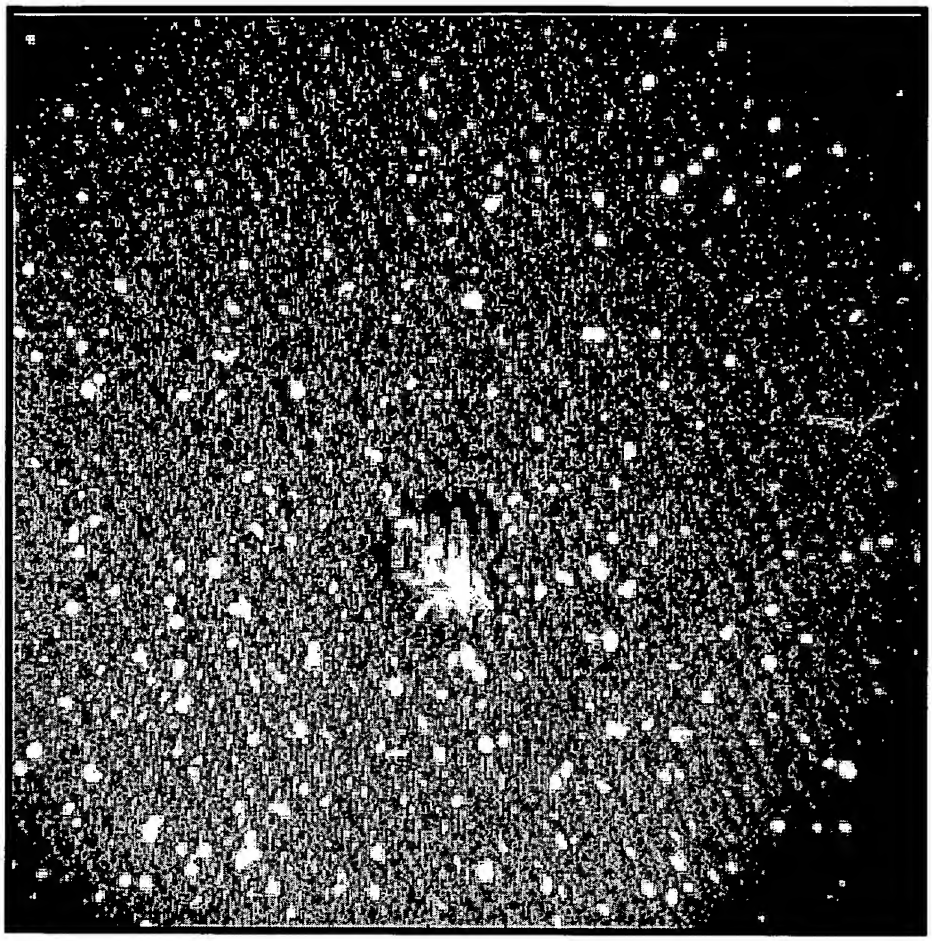


Figure 11

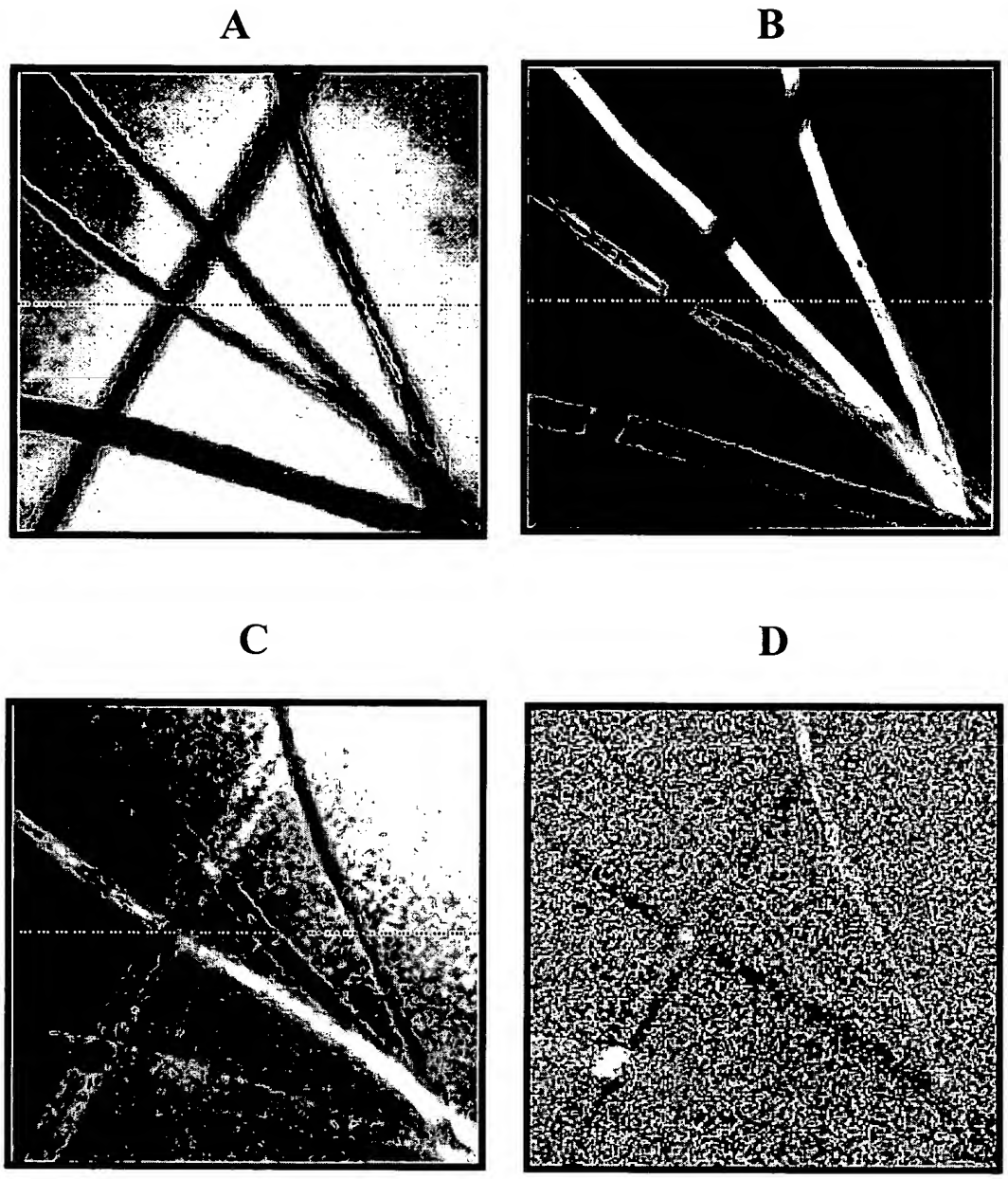
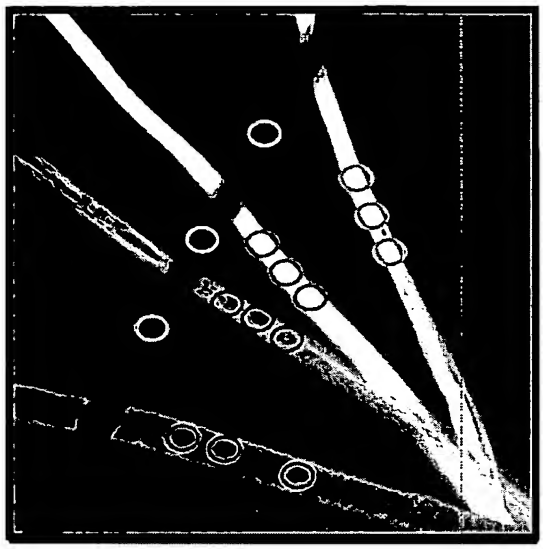


Figure 12

A



B

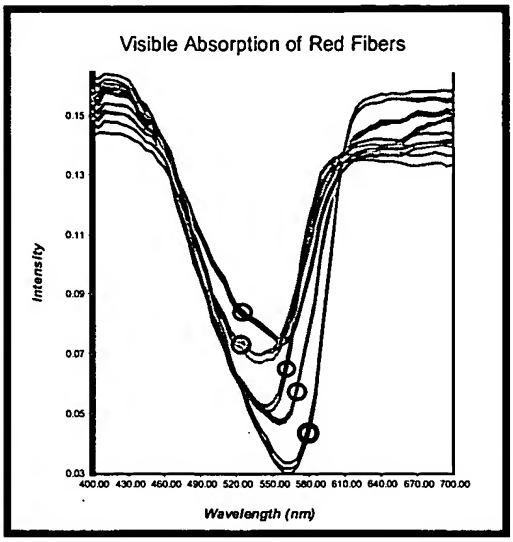

Visible Absorption of Red Fibers
Intensity
0.15
0.13
0.11
0.09
0.07
0.05
0.03
400.00 430.00 460.00 490.00 520.00 550.00 580.00 610.00 640.00 670.00 700.00
Wavelength (nm)

Figure 13

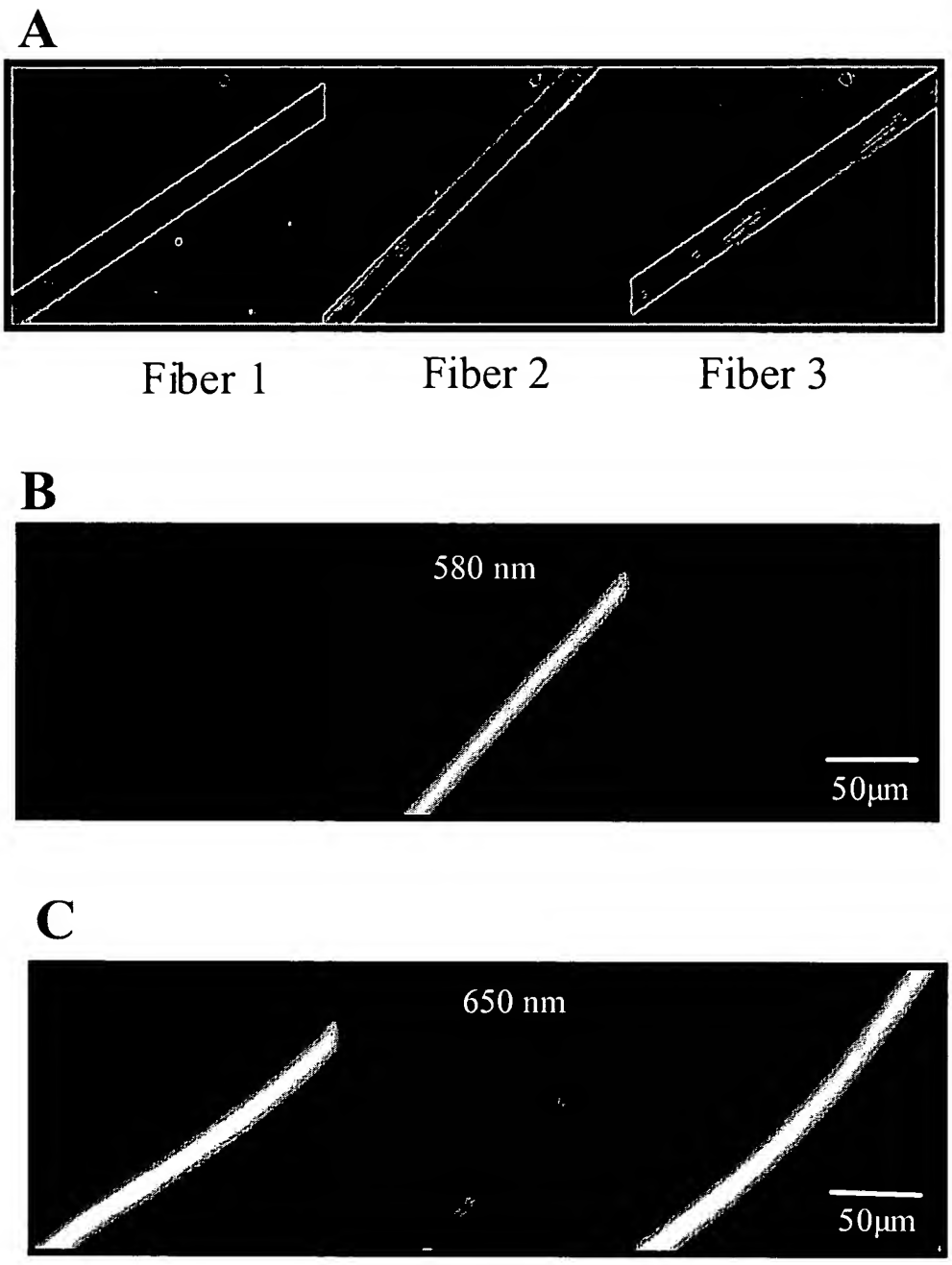


Figure 14

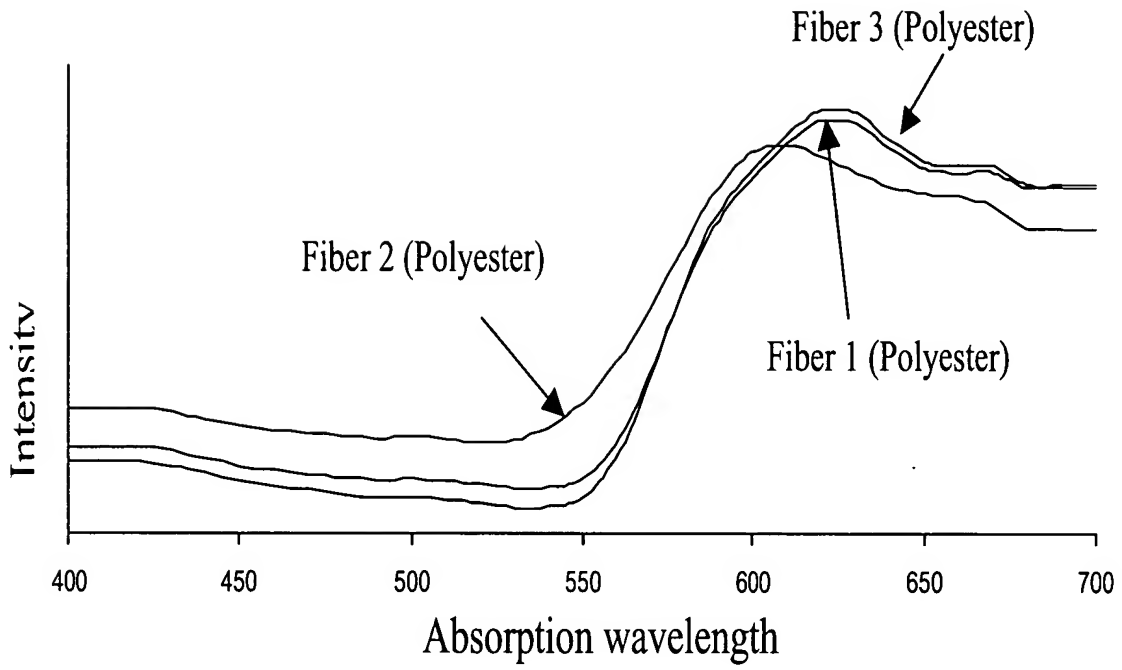

Fiber 3 (Polyester)
Fiber 2 (Polyester)
Fiber 1 (Polyester)
Intensity
400
450
500
550
600
650
700
Absorption wavelength

Figure 15

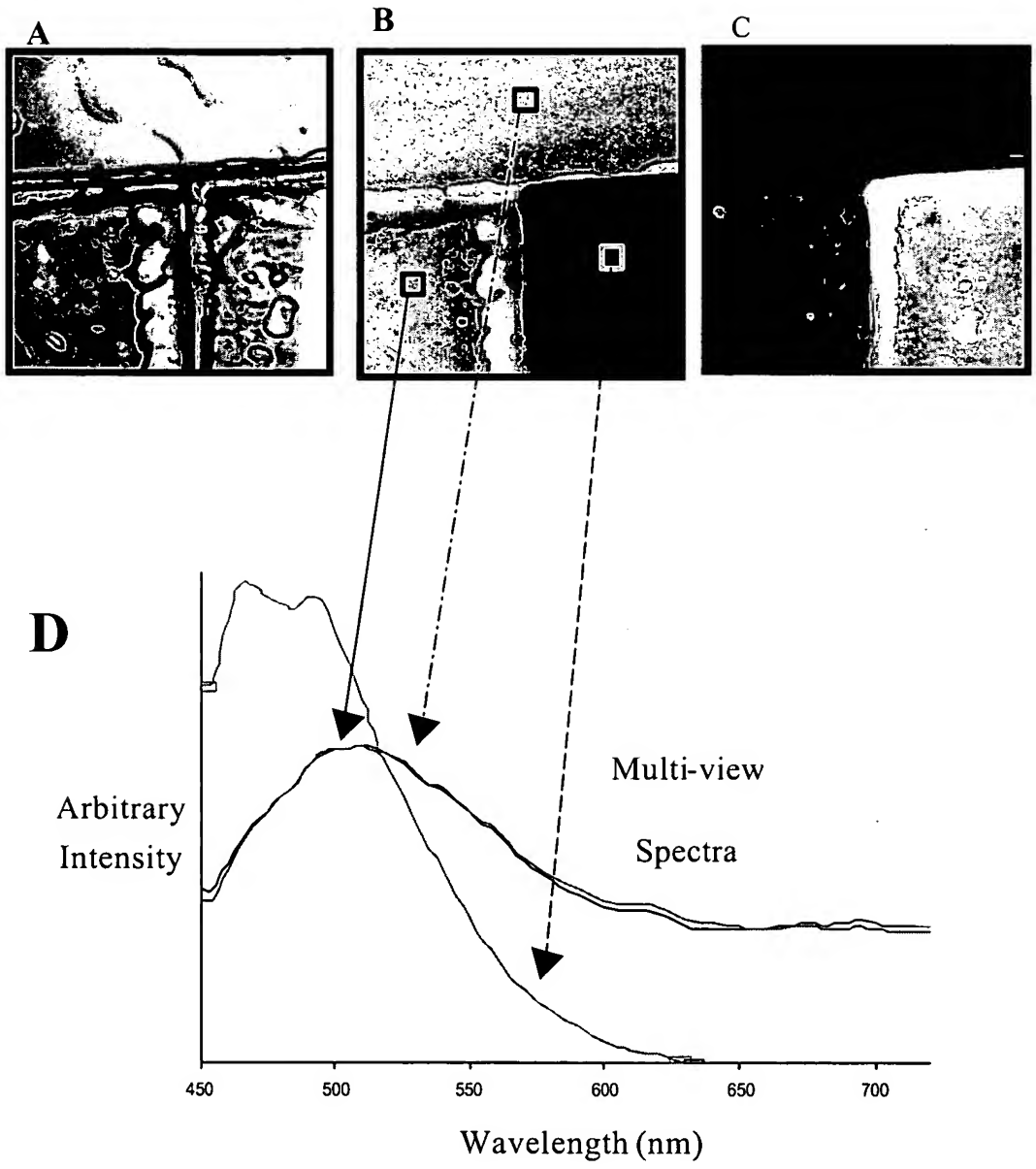

A
B
C
D
Arbitrary
Intensity
Multi-view
Spectra
450
500
550
600
650
700
Wavelength (nm)

Figure 16

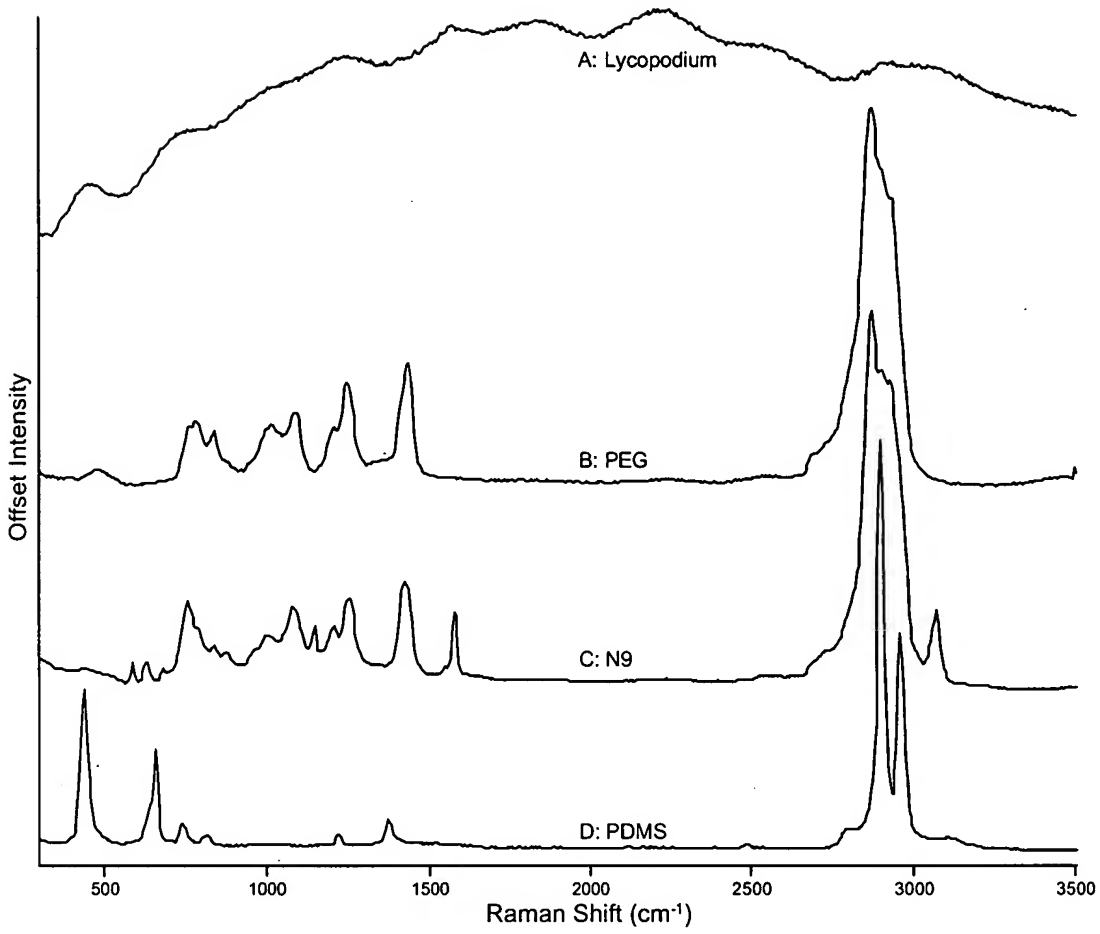

A: Lycopodium
B: PEG
C: N9
D: PDMS
Offset Intensity
500
1000
1500
2000
2500
3000
3500
Raman Shift (cm-1)

Figure 17

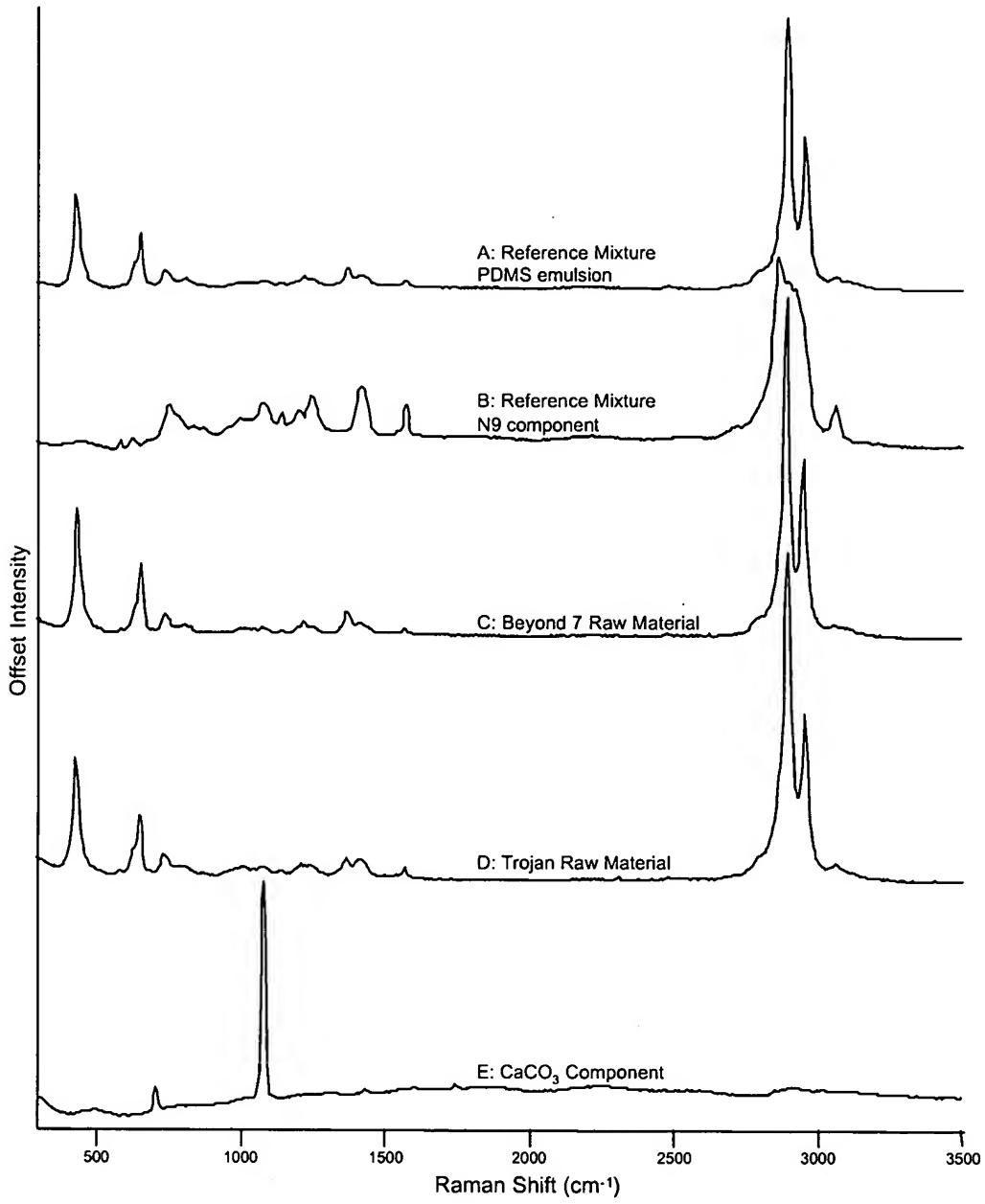

A: Reference Mixture
PDMS emulsion
B: Reference Mixture
N9 component
C: Beyond 7 Raw Material
D: Trojan Raw Material
E: CaCO3 Component
Offset Intensity
500
1000
1500
2000
2500
3000
3500
Raman Shift (cm-1)

Figure 18

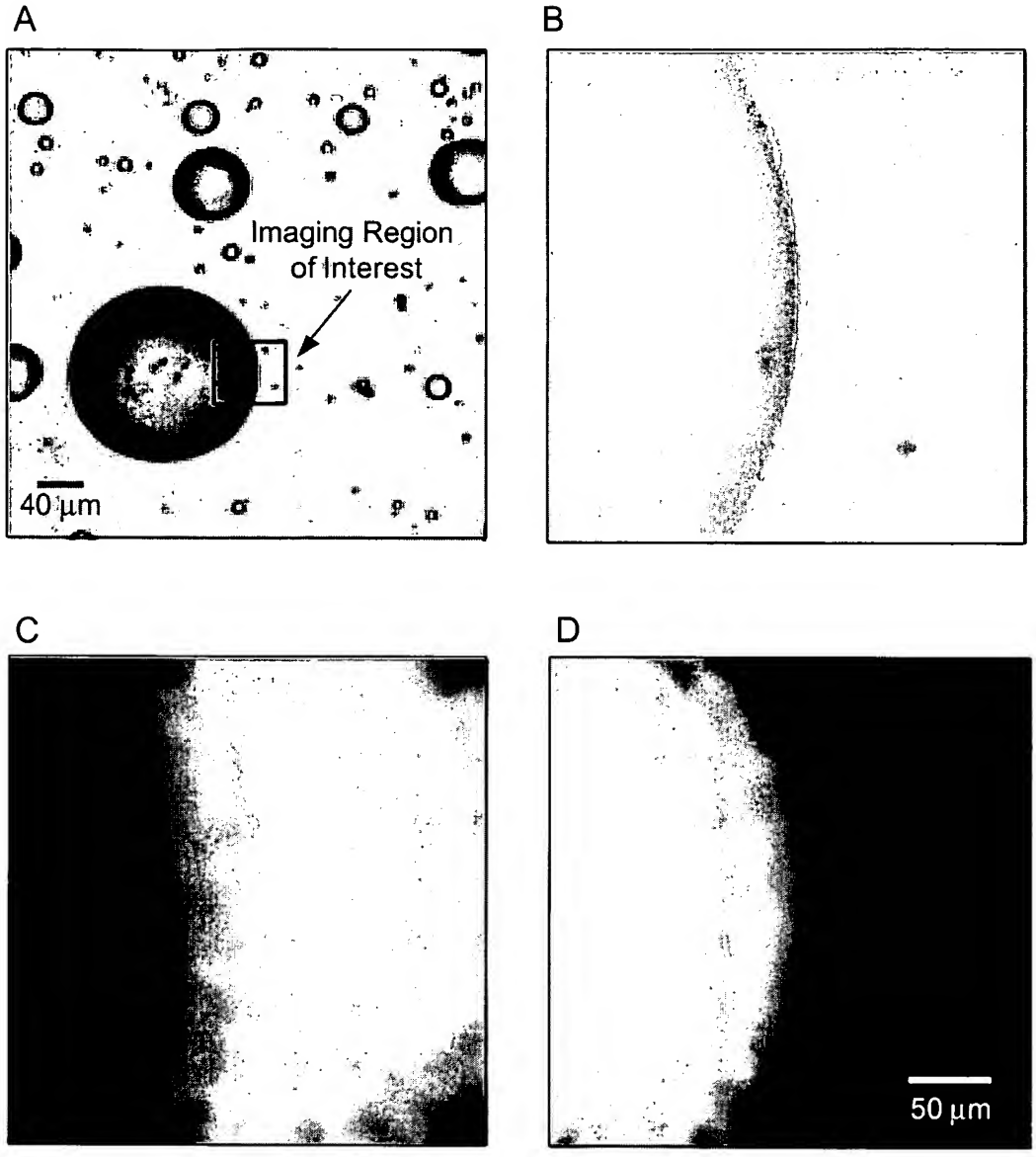


Figure 19

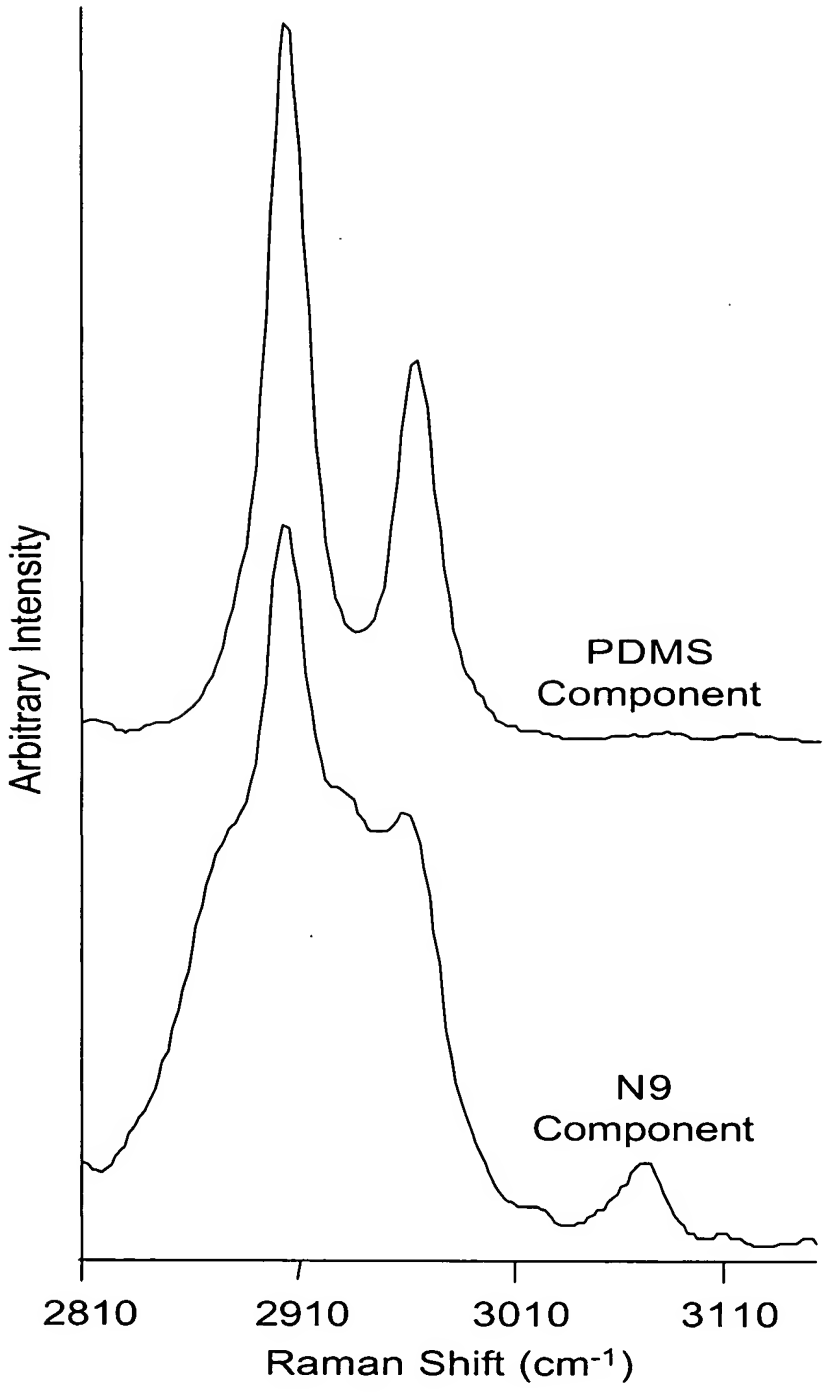

Arbitrary Intensity
PDMS
Component
N9
Component
2810
2910
3010
3110
Raman Shift (cm-1)

Figure 20

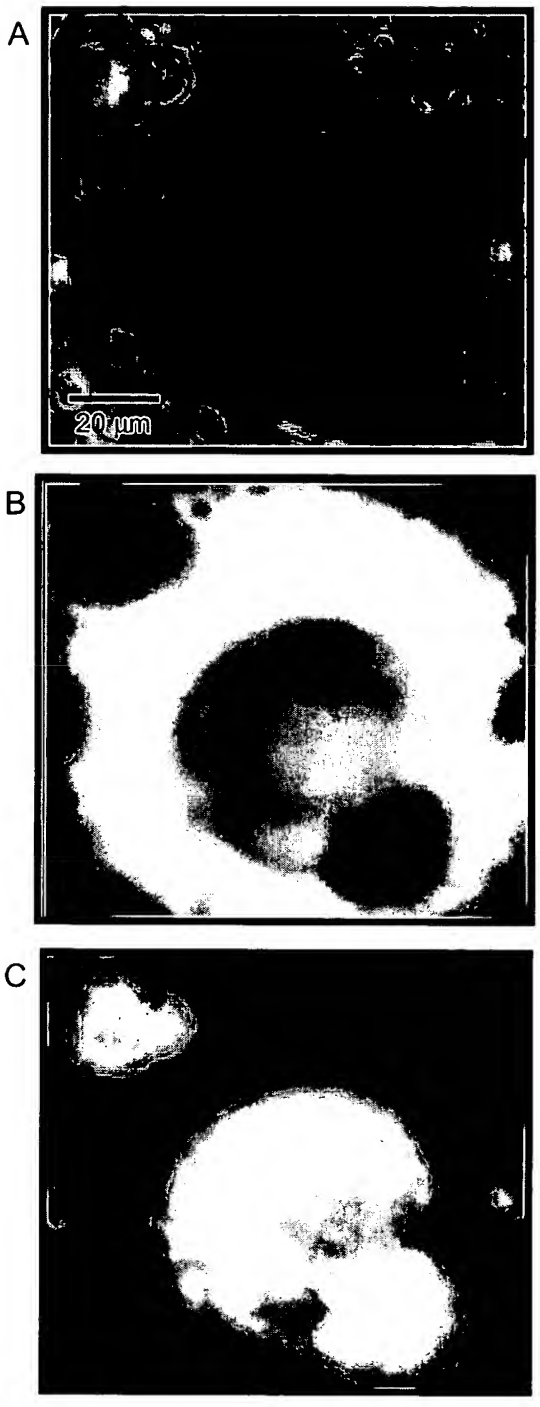


Figure 21

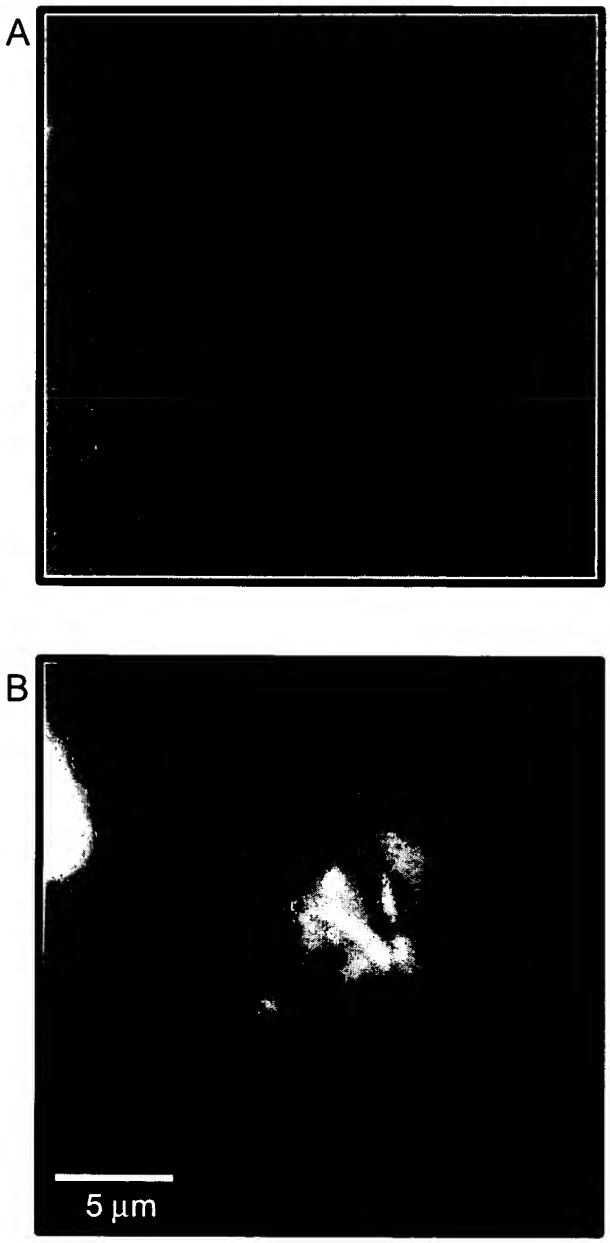


Figure 22

Table 1: RF values of band distances

Unknown Ink 1		Known Ink 7	
Spot	R_F	Spot	R_F
1	0.5381	1	0.5934
2	0.581	2	0.624
3	0.6048	3	0.6445
4	0.6381	4	0.6701
5	0.8786	5	0.8568
Unknown Ink 2		Known Ink 5	
Spot	R_F	Spot	R_F
1	0.3119	1	0.3839
2	0.3786	2	0.4425
3	0.4214	3	0.4817
4	0.4786	4	0.5232
5	0.5476	5	0.5721
6	0.5952	6	0.6064
7	0.6429	7	0.6308
8	0.8405	8	0.8191

Figure 23

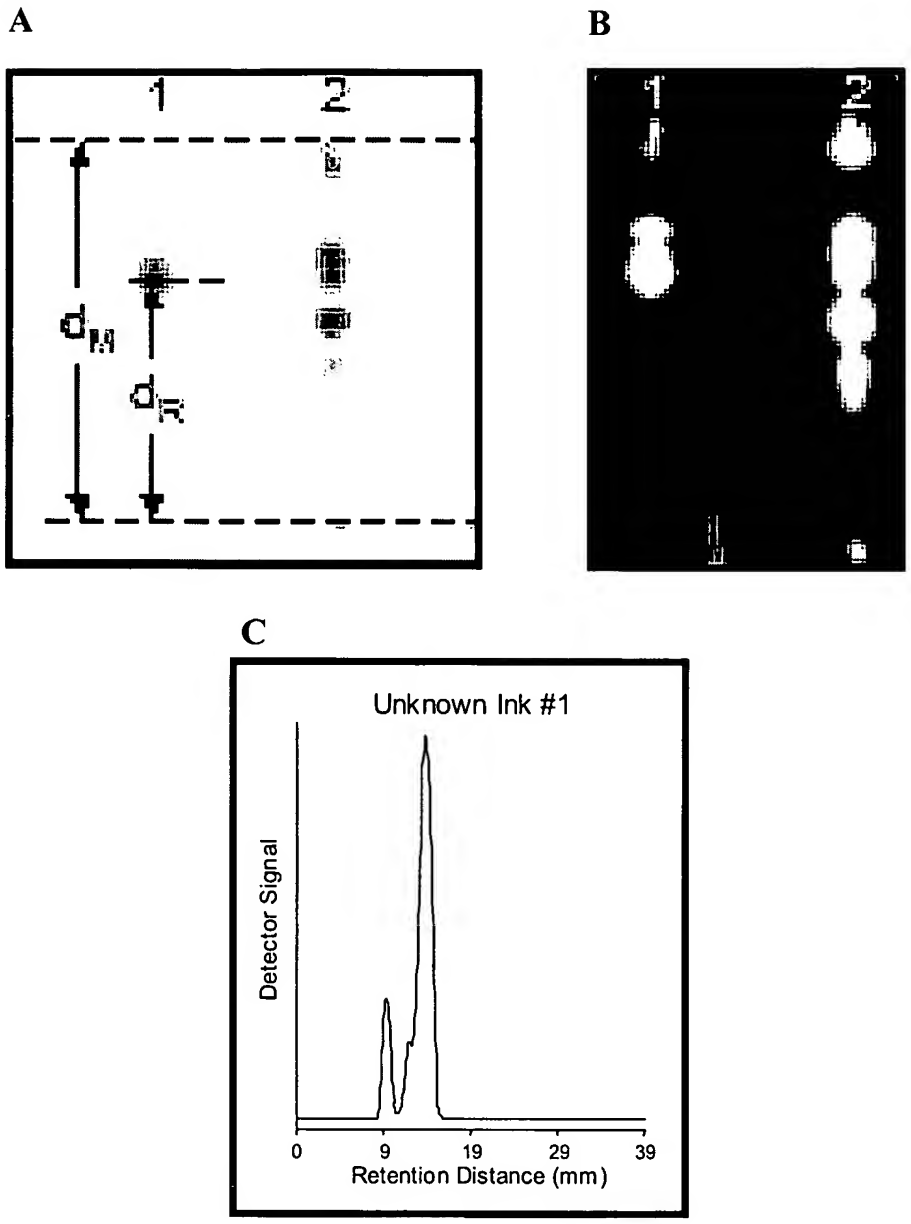

A
B
C
1
2
1
2
d_M
d_R
Unknown Ink #1
Detector Signal
0
9
19
29
39
Retention Distance (mm)

Figure 24

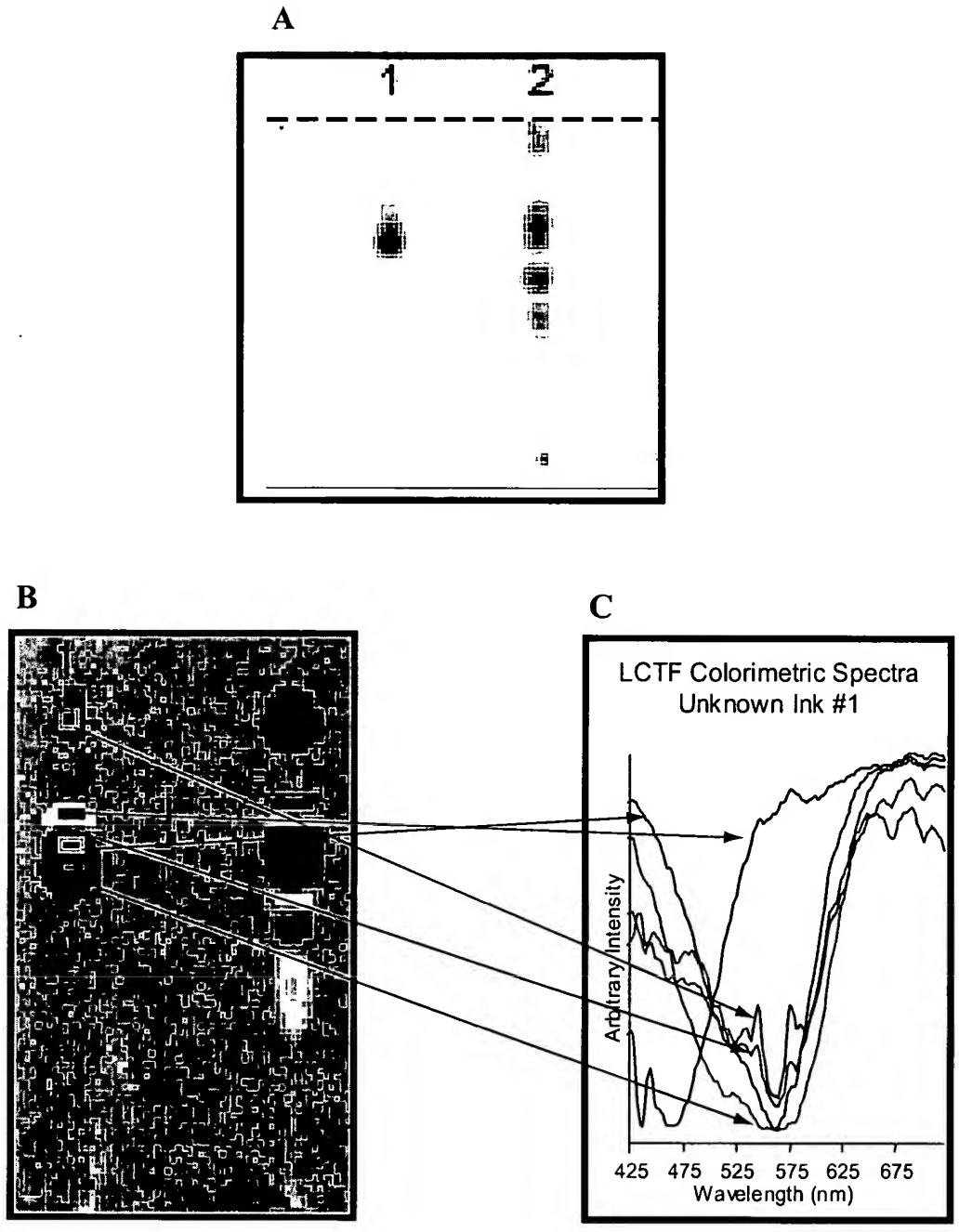

A
1
2
B
C
LCTF Colorimetric Spectra
Unknown Ink #1
Arbitrary Intensity
425 475 525 575 625 675
Wavelength (nm)

Figure 25

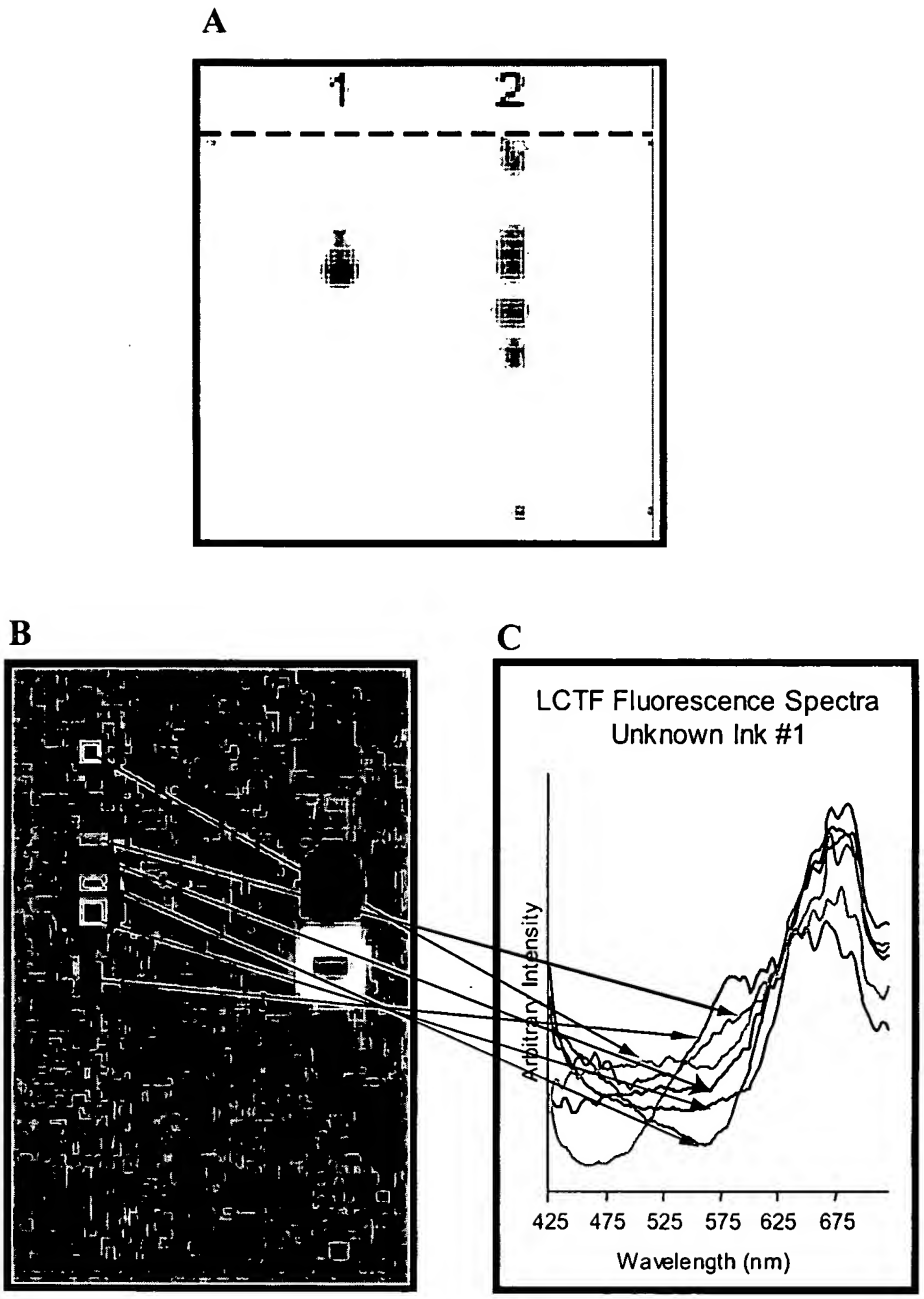

A
1
2
B
C
LCTF Fluorescence Spectra
Unknown Ink #1
Arbitrary Intensity
425
475
525
575
625
675
Wavelength (nm)

Figure 26

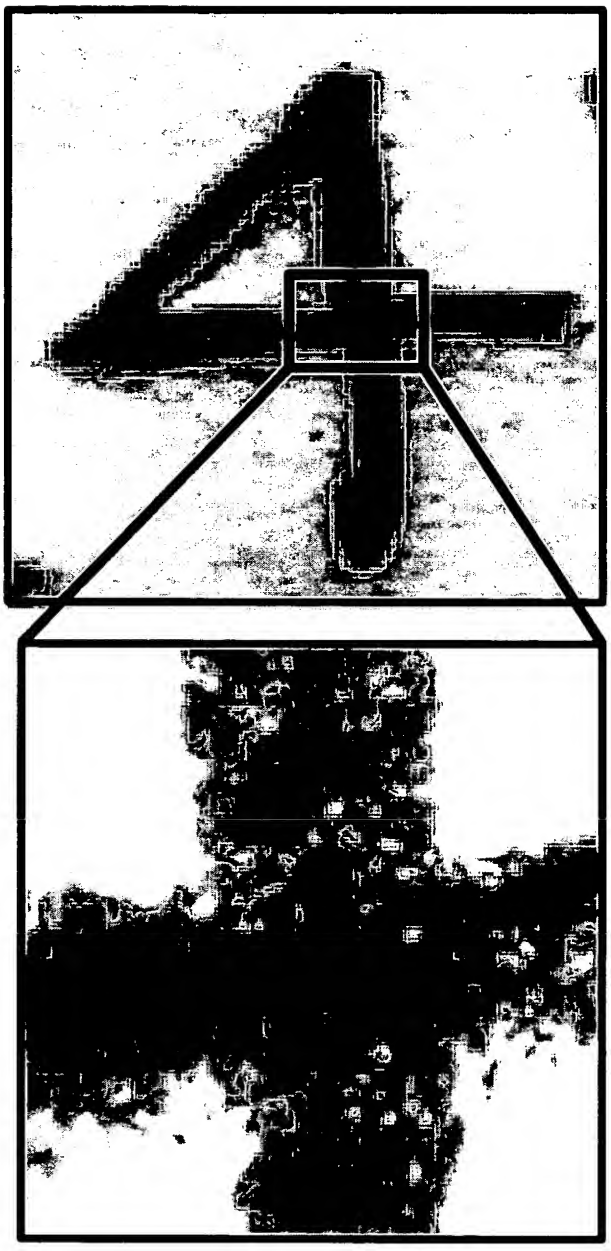


Figure 27

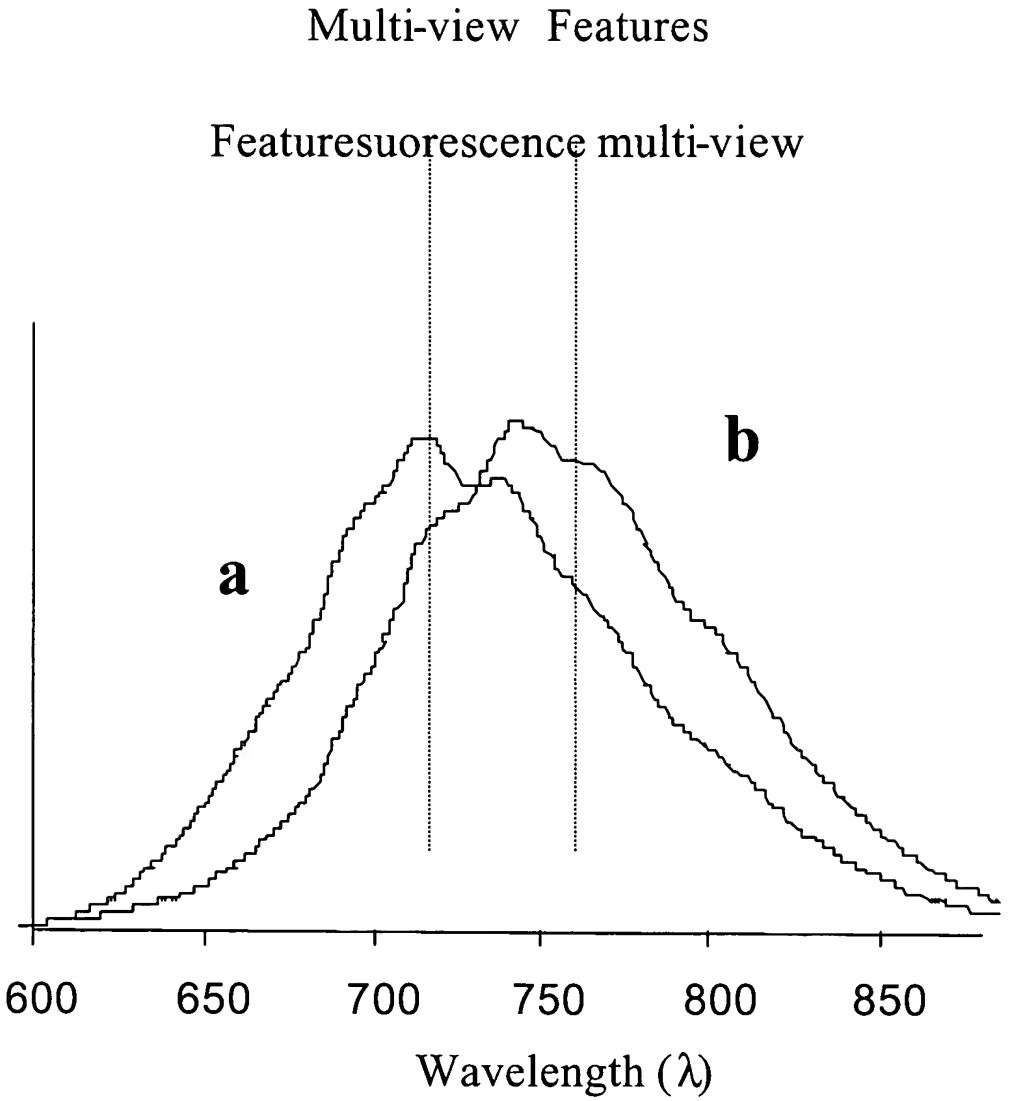

Multi-view Features
Featuresuorescence multi-view
a
b
600
650
700
750
800
850
Wavelength (λ)

Figure 28

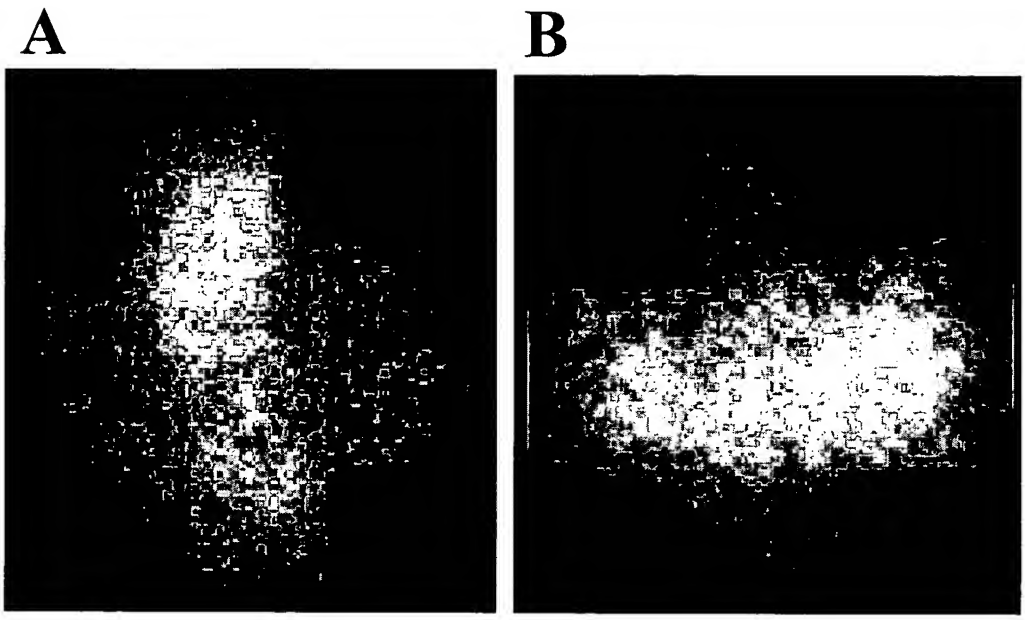


Figure 29

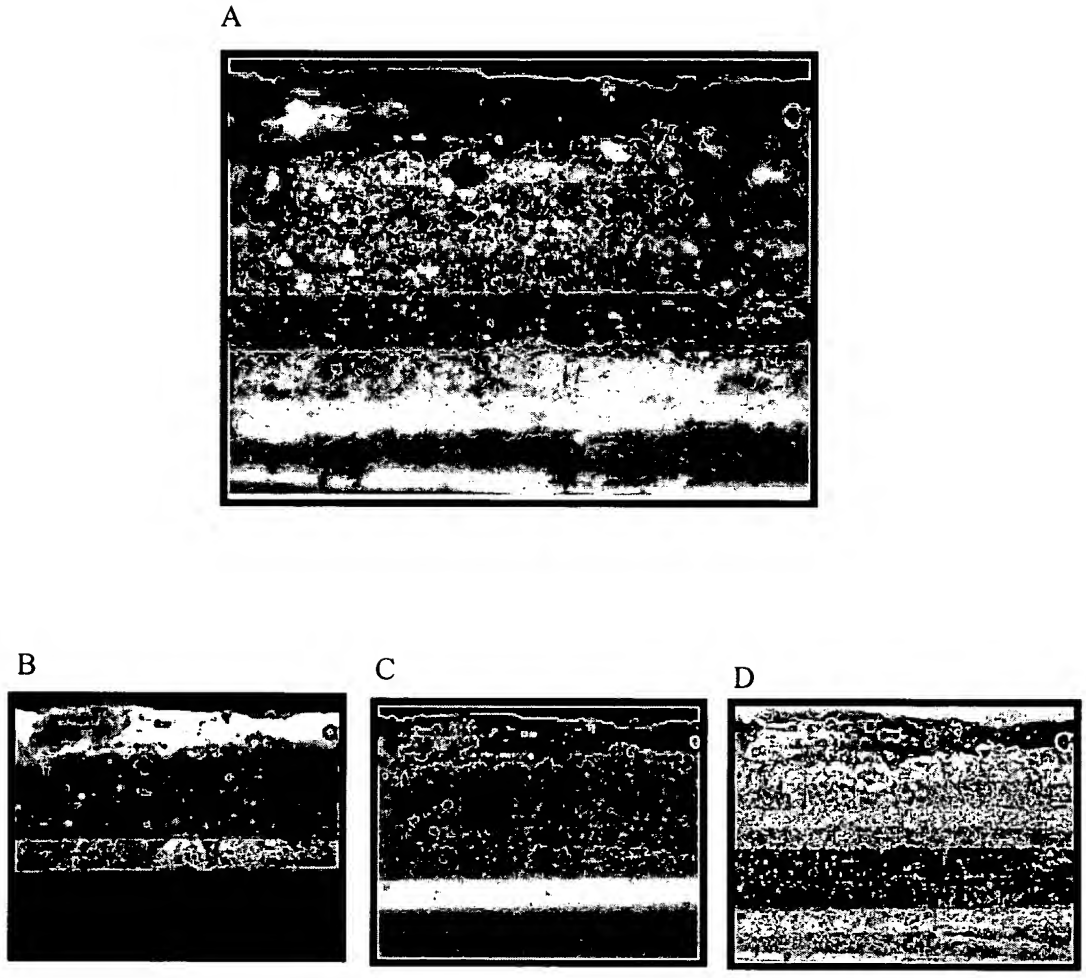


Figure 30